APPENDIX E

Bluetooth Stack In Windows

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Agenda

- Bluetooth Architecture in Windows
  - Goals
  - Components of the Stack
  - Functionality
- Opportunities for IHVs and ISVs
  - Applications
  - Services
  - Devices

High Level Goals

- PC work with all devices
  - Bluetooth Devices as PC peripherals
  - Bluetooth Devices as PC companions
  - Bluetooth Devices bridge to network resources through a PC
- Easy to configure and operate
- Extensible architecture
  - Platform for third parties to add value

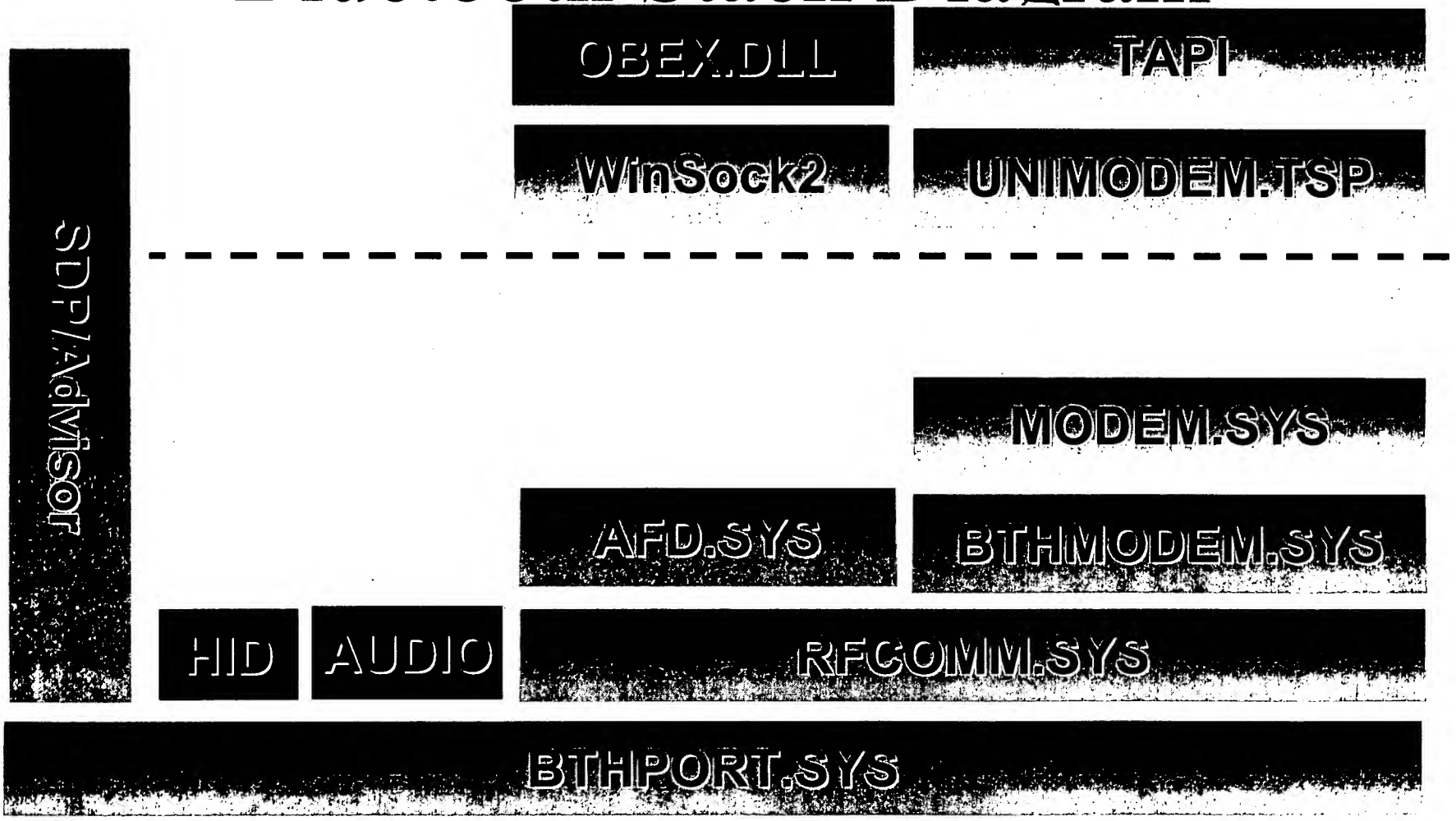
Scenarios

- Device configuration:
  - Discovery
  - Bonding
- Syncing and transfer through OBEX
  - Files
  - Pictures
  - Vcards
- Dial up Networking
  - Cell as modem
  - Null Modem for Peer to peer
- Generic RFComm applications
  - Non-OBEX synchronization
  - Other serial-type applications

Technical Requirements

- Bluetooth 1.0 Type II device classification supported
- Required profiles
- Bus Management Infrastructure
  - Device and radio configuration
  - Control panels
  - System Trays
- Extensible framework for value adds
  - Devices
  - Profiles
  - Bus mgmt software
  - RFComm applications
  - Object Exchange and special object handling
  - RAS and TAPI over Unimodem

Bluetooth Stack Diagram



Stack Components

- BthPort
  - L2Cap / HCI
  - Hardware abstraction: Serial, USB…
  - Enumeration of Found Bound Services
- SDP/Management UI
  - Bus management:
    - User notification of newly discovered devices
    - User assisted Configuration and Bonding
    - Configuration of radio
  - Local Service Exposure and Publication

Stack Components

- RFCOMM
  - RFComm Profile
  - TDI interface for WinSock (AFD)
  - Bus enumeration for DUNs
- BthModem (a WDM modem)
- OBEX.DLL
  - Object Exchange 1.2
  - Bus Agnostic

BthPort

- Support Currently Defined buses: USB, Serial, 16550
- Plug and Play events
- Bluetooth Request Blocks

SDP

- Provide a "builder" interface to easily create a service record
- Kernel mode
  - Client drivers can submit a list of UUIDs to search for on all newly discovered devices or initiate a SDP search outside of device discovery
  - BThPort will search for all the services in the browse group hierarchy
- User mode
  - Initiate searches
  - Browse service records

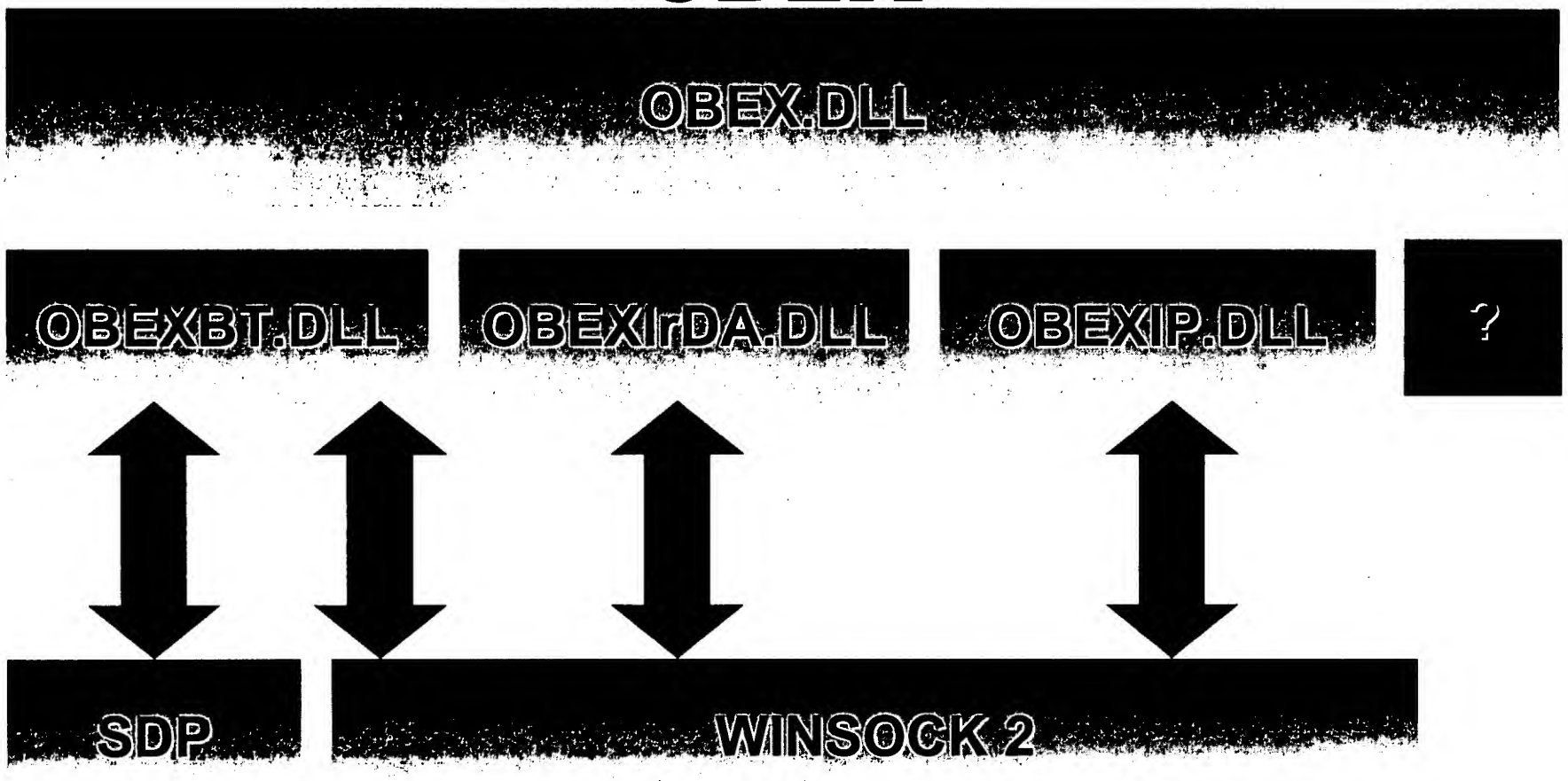
Management UI

- Present user with devices in range and bound devices
- Allows the user to easily change the relationship with remote device
- Provide unobtrusive PIN and authorization notifications
- UI is accessible from third-party applications for a standard user experience
- Advanced features
  - Filter devices based on COD or address
  - Local radio settings
  - Manage power policies

OBEX

- Full OBEX 1.2 implementation:
  - Put
  - Get
  - SetPath
  - Definable transactions
- COM API
- Extensible to other media and transports

OBEX



RFCOMM

DUN/Lan Access

File Transfer/OBEX

Opportunities To Add Value

- RF comm applications
- OBEX applications/extensions
- Bluetooth management application
- New device types and/or class drivers
- Radios on new hardware buses

RF Comm Applications

- Applications looking for virtual serial ports not supported
- Legacy TAPI/Unimodem applications see peer devices as NULL Modems
- Applications enumerate Modem/Serial Devices through Unimodem

RF Comm Applications

- Winsock allows for dynamic discovery and communication
  - Talk to the device, not to the conduit ("My Laserjet" versus LPT2)
  - Once bonded device is in range the application can find and use it
  - Allows for multiple remote connection to same service
  - Not necessary to manage multiple virtual COMx ports

OBEX Applications

- Examples
  - Photos
  - Vcards (not "in the box")
  - Simple databases
- Server
  - Registration
  - New Obex Commands and types
  - Application can register as handler for custom commands
- Client
  - Discovery
  - Navigate directory structure (enumerate objects)
  - Push Pull objects

Bluetooth Management Applications

- Substitution of stock Microsoft Plug and Play experience
  - Configuration and bonding of devices

New Profiles Types

- Native L2CAP
- Examples:
  - HID
  - Remote NDIS
  - Doom Server with Streaming Audio (utilize native audio channels)

New Profile Types

- Server
  - Registers with SDP/Adviser module
  - No Plug and Play event until remote peer connects
  - PDO means active connection on which local server driver loaded
- Client
  - BthPort finds remote service
  - Signals SDP/Advisor to determine if user wants to use this device (Approval Wizard)
  - Plug and Play event (PDO) means active connection on which local client driver loaded

New Hardware Buses

- Examples
  - Register set for Card Bus/PCI
  - 1394
- Miniport

Calls To Action

- Is your value add method missing?
- We need your hardware
  - Phones
  - Radios
  - Phones
  - Peripherals
  - Phones
  - PDAs
- We need your software
  - Applications and drivers
  - Can we upgrade you?
- Come to the developers' conference

References

- http://www.microsoft.com/hwdev/bluetooth
- Contact: BTINFO@Microsoft.COM


WinHEC 2000
Windows® Hardware Engineering Conference
Microsoft
Texas Instruments

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- Server
  - Registration

- Beta test our software
  - Learn first hand what is intuitive, and what is not
  - Which features should be more readily available
  - Which features are rarely used
- Provide us feedback
- Provide us hardware
  - Allows us to test the user experience with a wide range of scenarios

- New Obex Commands and types
- Application can register as handler for custom commands

- Client
  - Discovery
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